

Monitoring chemical contaminants and residues in insects: focus on mycotoxins

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A growing world population together with ecological as well as economic concerns related to livestock industry enhances the quest towards alternative protein sources of which insects are acknowledged to have great potential. The new European Novel Food legislation (Regulation 2015/2283) requires that, before January, 1, 2018 for all (products of) insects for human consumption, an application for authorization must be submitted for authorizing the placing on the market of these products. Until that date, the current Belgian tolerance of 10 insect species continues to apply. In this Novel Food regulation scientific evidence of the safety for human health must be demonstrated.

In the advice of the Federal Agency for the Safety of the Food chain (FASFC) and Superior Health Council (SHC), the potential microbiological, chemical, and physical hazards related to the consumption of edible insects, is questioned. In an attempt to guarantee health-safe end products, we aim to map and monitor the relevant (organic) chemical contaminants and residues. To achieve the latter purpose, the development of a broad-range analysis method, specific for insect tissues as well as their feed/substrates is mandatory.

The compounds of interest include at least 25 pesticides (herbicides and insecticides), 29 relevant veterinary drugs and coccidiostats, a bacterial toxin and a total of 25 mycotoxins. The mycotoxins originate from different fungal genera i.e. *Aspergillus*, *Penicillium*, *Fusarium* and *Alternaria*. For separation and detection, ultra-high performance liquid chromatography coupled to quadrupole Orbitrap high-resolution mass spectrometry (UHPLC-Q-OrbitrapTM-HRMS) is the platform of choice. Optimization of the parameters of both the LC (gradient, column, solvents, temperature,...) and MS (gases, temperature, voltage,...) resulted in a short method (10 min) that proved successful for the separation and detection of the 80 analytical standards. Assisted by a fractional factorial design, generic extraction protocols for several insect species (including *Hermetica illucens*, *Tenebrio molitor*, *Locusta migratoria* and *Acheta domesticus*) and their potential substrates (including wheat-bran, grass, waste products (supermarket), dry cat food, chicken blood and faeces) are currently under development. Next, the analytical methods will be validated and applied for the targeted and untargeted analysis of the specified chemical contaminants and residues in edible insects and their substrates. Final results are expected by summer 2016, allowing the majority of the results to be documented at the conference meeting.